

The SEMON LECTURE

1925.



P. WATSON - WILLIAMS

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THE SEMON LECTURE (NOVEMBER 1925)
UNIVERSITY OF LONDON

The Toll of Chronic Nasal Focal Sepsis on Body and Mind

BY

PATRICK WATSON-WILLIAMS, M.D. (Lond.), etc.

*Consulting Surgeon for Diseases of the Ear, Nose, and Throat, Bristol Royal Infirmary;
Formerly Lecturer on Otology and Laryngology at the University of Bristol, and
President of the Laryngological Section of the Royal Society of Medicine, London*



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FOREWORD

THE essential Thesis of this lecture is to emphasise the influence of chronic focal sepsis of the Upper Air Tract on Mind and Character—as well as a prolific source of disease involving many regions of the body.

The mental and physical influence of Septic Tonsils and Adenoids being well-known examples of focal sepsis, other less known yet equally potent sources of focal sepsis and their influence on cerebration are traced. The less pronounced mental symptoms are liable to be overlooked (unless inquired into), while in the more pronounced psychosis the mental aberration often obscures the causal factor of focal sepsis.

NOTE.—As all the patients mentioned recovered, Figs. 3, 5 and 7 are only hypothetical diagrams.

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THE TOLL OF CHRONIC NASAL FOCAL SEPSIS ON BODY AND MIND.*

By PATRICK WATSON-WILLIAMS, M.D. (Lond.), Consulting Surgeon
for Diseases of the Ear, Nose, and Throat, Bristol Royal Infirmary.

To be appointed the Semon Lecturer in Laryngology in the University of London is a great and highly-esteemed honour, but for one who worked and wrote with, and knew the illustrious founder as a true and trusty friend, it is a sacred privilege to join my distinguished predecessors in this office in weaving a garland to the memory of Felix Semon.

Others have reviewed the pioneer researches and clinical contributions by which the genius of Semon advanced the science and practice of laryngology throughout the civilised world. It was, however, the interests of his colleagues in this country that were nearest his heart, and uppermost in thought even in his retirement, although it was characteristic of Semon to seek no credit for innumerable kindly actions for our benefit, often quite unknown outside his most intimate friends. Amongst them the feeling he inspired is so well expressed by the lines of the great dramatist—

“The dearest friend to me, the kindest man,
The best-conditioned and unwearied spirit
In doing courtesies.”

.

In the firm belief that our specialty is destined to afford valuable contributions to the solution of some of the problems

* The Semon Lecture, University of London, delivered in the Hall of the Royal Society of Medicine, London, 5th November 1925.

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arising in the domain of the physician, surgeon, or alienist, I invite consideration of certain aspects of chronic nasal sepsis. Among those I have the honour to address are many colleagues who have themselves contributed much to the current knowledge of acute and chronic septic disease of the nose and ear, and to the accepted operative measures that the last half century has elaborated, and it is not my purpose to traverse these well-worn paths.

It is inevitable that the diagnosis and treatment of the more serious disease within our own territory should engross our chief attention, yet it is within our sphere to trace the influence of the local disease in other domains, so to speak, "to think imperially of our overseas colonies" of sub-infections.

More and more is it being recognised that focal sepsis is directly accountable for disease far afield from the local infective source, and involving various regions such as the alimentary and respiratory tracts, the heart, arteries, kidneys, joints, and peripheral nerves; and, further, that sepsis has an important bearing in many cases of mental disturbance and even delusional insanity. It seems desirable, therefore, to consider how far such an array and variety of diseases is attributable to, or influenced by, septic infections of the nose, throat, and ear, the most prolific sources of sepsis of any part of the body.

Oral and tonsil sepsis, apart from "adenoids," is eliminated from discussion here because the influence of the mouth, teeth, and tonsils as a source of sepsis is already appreciated; perhaps at times overestimated so as to obscure the factor of sinus sepsis. Yet there is little doubt that septic tonsils and adenoids may be only sub-infections of nasal sinus infection. Hence the cases of repeated removal of adenoids reinfected by an overlooked sinus infection (see Table B).

The complications of nasal focal sepsis, apart from direct extensions to surrounding structures (which are altogether excluded from our consideration), involve other territories in two distinct ways.

1. By the infective organisms being inhaled or swallowed and thus directly entering the pulmonary or the gastro-intestinal tract.
2. By the toxins (and sometimes the organisms themselves) passing into the lymph-vascular or blood streams, and thus implicating the heart, arteries, kidneys, joints, peripheral nerves, and the cerebral hemispheres.

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The first group, though of great interest, we can only allude to very briefly within the limitations of a single lecture, while the second is so comprehensive and far reaching, that, although receiving our chief attention, it likewise can at best be dealt with most inadequately.

Group I.—Infective Organisms Inhaled or Swallowed.

The Respiratory Tract.—We know that septic tonsils and adenoids are a fruitful source of recurrent bronchitis in children, but the septic focus may lie in a nasal sinus, particularly in later life when tonsils and adenoids are normally atrophied.

The frequent occurrence of sinusitis in children has also been the subject of many communications, and I would recall the researches of Mollison based on explorations with my suction syringe. Again, while we have learnt that enlarged cervical glands are much more often due to sepsis than to tubercle, we have yet to determine how great a percentage of so-called pulmonary phthisis, cases unsupported by the evidence of tubercle bacilli, are in reality non-tuberculous and simply sub-infection pulmonary sepsis. A nasal sinus infection is a serious factor in pulmonary tuberculosis, but the wasting of chronic sinus sepsis with bronchial sub-infection, nocturnal rise of temperature, night sweats, expectoration and febrile reaction to exercise, affords a clinical picture hardly distinguishable from true pulmonary tuberculosis, often further enhanced by a chronic septic laryngitis.

The Gastro-Intestinal Tract.—Patients with septic infection of the mouth, throat, or nose often swallow daily millions of pyogenic organisms with relative impunity, the gastric juice being strongly bactericidal. But, when overwhelmed with the swarms of virulent organisms from the mouth or nose, gastro-intestinal catarrh and flatulent dyspepsia quite commonly develop, and diarrhoea, alternating with constipation, and even definite colitis are not rare consequences. How far appendicitis, gastric or gastro-duodenal ulcers are caused by persistent reinfection from organisms swallowed is difficult to determine, but the extraordinary percentage of patients with chronic sinus infection who have undergone operation of appendicectomy, or have suffered from gastric or duodenal ulcer, is most striking and suggestive. The coincidence is usually unnoticed, because in this connection the surgeon and the laryngologist respectively do not usually make the necessary inquiries.

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Dr Nathan Mutch attributes chronic colitis to mass-infection by swallowing the streptococci of pyorrhœa alveolaris, and shows how these glyco-phyllic organisms tend to prevail especially in the ileo-cæcal region.

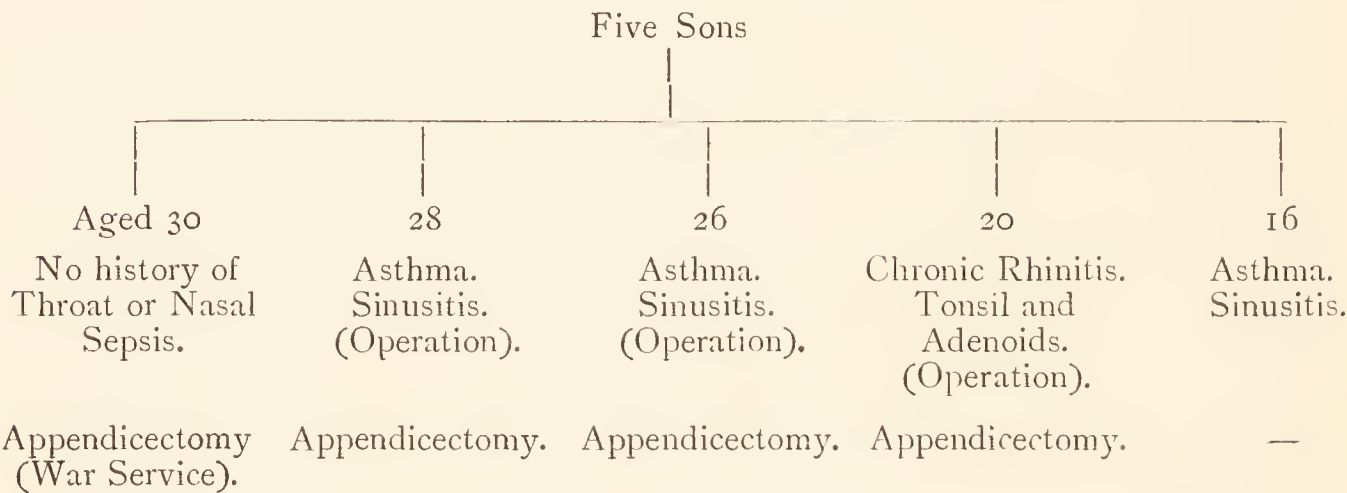
The infectivity of chronic nasal sepsis and, furthermore, its causal relationship to appendicitis are perhaps even more strikingly suggested in families where a parent acts as a carrier infecting the children. I cite in the accompanying Table two illustrative examples of this:—

TABLE.

(A)—FATHER, aged 58.

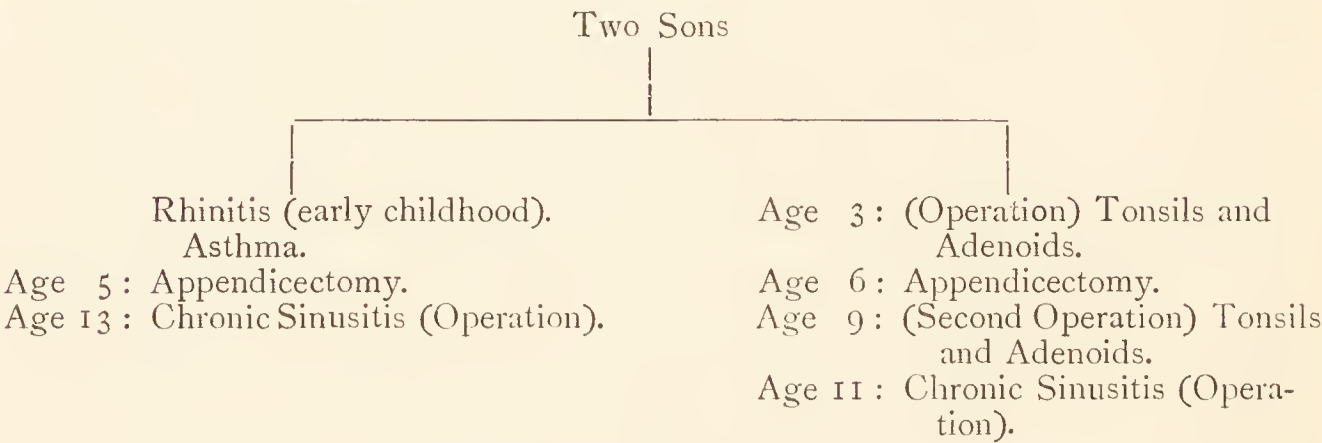
Catarrhal Otitis for thirty years.

Chronic Sinusitis (Operation thirteen years ago and still infective three years ago).



(B)—FATHER, aged 59.

Chronic Nasal Catarrh and Sinusitis of many years' duration.



The important factor of infection conveyed to young children by parents, brothers or sisters, or by nurses who, while showing no obvious symptoms of sinusitis, act as carriers, is also stressed by Dr R. C. Clarke as the outcome of observations on several thousand children in his clinics.

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We recognise that diphtheria, scarlatina, and enteric fever may be spread by "carriers," but the spread of chronic septic throat and nasal infection is a still more constant menace.

Group II.—Infection through the Lymph-vascular or Blood Streams.

Neuralgia and Neuritis of Peripheral Nerves.—Sciatica and various manifestations of neuritis are the common heritage of focal sepsis, and the nasal passages sometimes contain the infective source. While it is now generally accepted that migraine, supra-orbital and occipital headache are commonly due to nasal sinusitis, it is less generally recognised that intense neuralgic pain in the fifth nerve, of the *tic-douloureux* type, may be due to a toxæmic neuritis from para-nasal sepsis. Dr Wilfred Harris, with a wealth of experience in these painful cases, states that "it seems highly probable that they are due to septic neuritis of dental nerve filaments, and he has been impressed by the number in which the pain has definitely started immediately after dental operations or antral abscess."

A lady, aged 58, was referred to me in September 1918 for severe pain in and beneath the right malar bone, believed to have been due to, and following, extraction of a right septic upper molar a year before. Her doctor suggested nerve stretching or alcohol injection, or a Krause-Hartley operation, if all else failed. Exploration of the sinuses revealed a staphylococcic infection in the right antrum, the other sinuses being sterile. She appeared to be cured for two years by opening and draining the antrum, and, though pain returned slightly two years later, was again relieved by antral lavage and disinfection. Manifold affections may arise from irritation of the sensory nerve endings in the mucosa, either directly or reflexly through communications of the sensory nucleus of the fifth nerve with the motor vagus nucleus in the medulla. Of these it must suffice to mention only neuralgia, paroxysmal sneezing, and asthma of nasal origin. The influence of nasal stimulus on the vagus is recognised in practice when smelling salts are used in faintness.

Orbital Complications.—Manifold infections involving the orbit and globe, dacryocystitis and orbital abscess from ethmoiditis or sphenoidal sinusitis are often enough legacies of nasal sinus sepsis, but being direct extensions of septic infection from the nose are outside the scope of this lecture.

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On the other hand iritis and cyclitis are often septic in origin, while the recorded examples of canalicular optic neuritis, relative scotoma and enlargement of the blind spot, are so numerous and important that it becomes impossible to enter on this large and interesting field.

Rheumatism and Rheumatoid Arthritis.—These conditions afford plentiful examples of either sub-infection or toxæmia from nasal sinus sepsis, although, hitherto, investigation of the source of infection has been mainly directed to the teeth and tonsils. Often the last areas to be considered are the nasal sinuses and the ear. Mollison, Sir George Newman, and many others have furnished proof of the tonsil as a focus of infection in rheumatoid arthritis, and of the good results obtainable by tonsillectomy.

A number of cases of rheumatoid arthritis in my own experience have been cured or relieved by draining infected nasal sinuses, but, as several of these have already been recorded, I will only refer briefly to one.

A lady who had suffered from articular rheumatism of the knees for thirty-two years, of the left wrist and finger joints for sixteen years, with the disease spreading to other joints, underwent courses of baths at Bath and at Vittel at different times for eight years. As she was becoming worse, she was referred to me by Dr La Marchand, because on inquiry he found she had slight opalescent post-nasal catarrh. Exploration of the nasal sinuses showed that all were sterile, except the sphenoidal sinuses which yielded polymorpho-nuclears with staphylococcus aureus and streptococcus brevis. Drainage of the sphenoidal sinuses was followed by a remarkable diminution of the swelling in the joints which lost their pain, and, without either baths or massage, became more supple. She also became free from headaches and felt much brighter and stronger. The remarkable improvement had been well maintained when I saw her for the last time a year later.

Before leaving the subject of rheumatoid arthritis, it is useful to recall the markedly neurasthenic symptoms so frequently associated with this disease. This occurs particularly in the earlier manifestations of joint involvement, when the patient is often more depressed and neurasthenic than in later years, when the progress of the joint affection gives greater cause for dismay and distress, perhaps because auto-immunisation has then removed the toxæmic factor of neurasthenia. Sharp records a case of rheumatism of twelve months' duration

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in a lady who for three months had developed melancholia, taking no interest in her husband, child, or home. The left sphenoidal sinus contained milky fluid, and was opened and drained with the happiest results; within three days she was restored to her usual cheerful disposition and home interests, and, in ten days, was permanently free from her rheumatic pains. We have here an illustration how neurasthenia from sepsis deepens into mental alienation, and that there is no line of demarcation between the mental depression of focal sepsis and insanity excepting only in degree.

Causal Relationship of Focal Sepsis to Mind and Character.

That toxæmia from oro-nasal sepsis, in the form of septic tonsils and adenoids or dental sepsis, may cause neurasthenia or mental unsoundness is common knowledge.

It has appeared superfluous even to recite the well-known and innumerable complications from adenoids and tonsil sepsis, though in these commonplace affections we have the best known example and perhaps most fruitful source of focal sepsis. Yet how slowly we reached a full appreciation of these infections since Wilhelm Meyer, in 1868, first described "Adenoïde Vegetationen" and the wondrous results following their removal; and Guye of Amsterdam in his description of "aprosexia," in 1872, presented us with a striking picture of toxæmic neurasthenia as regards the mental depression, poor memory, and utter inability to concentrate, etc. In 1889, William Hill, in his researches at Earlswood Asylum on adenoids as a cause of backwardness and stupidity, followed Guye in attributing the psychosis to communications between the intracranial and intranasal lymphatic and venous systems. At that distance of time, over thirty-five years ago, we attributed the symptoms far too much to mechanical nasal obstruction, whereas, nowadays, we realise that it is the degree of sepsis, not the hypertrophy, that measures the mischief caused by these lymphoid aggregations.

We may recall the work of Key and Retzius, and later of André, amongst others, which demonstrates the close relationship of the lymphatics of the pituitary membrane crossing the cribriform plate to the peri-meningeal lymph spaces. Even if there be no direct communications between them, they afford channels

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of cerebral intoxication by a process of transudation, much as para-labyrinthine infection causes a serous peri-labyrinthitis.

This may, in a measure, explain the frequent relationship of nasal sepsis to disturbances of mind and character; and also how the mental outlook, as well as the physical disabilities, improve so quickly as a result of operative removal of the source of sepsis in the teeth, tonsils and adenoids, or in chronically infected sinuses.

With the added social responsibilities and relationships of adult life, the psychic disturbances from focal sepsis are more striking and often more disastrous; the slighter degrees of mental disturbance which, in a child, might be hardly noticed, in the adult may be sufficient to cause unhappiness to the patient and those about him. Again, on account of the mild toxæmia, the mental deterioration may be so very slow in onset and development that the resulting inability to take an interest in anything, taciturnity, hesitation in coming to any decision, lack of memory for daily events, are often regarded as due to alteration in character rather than to a form of disease. The active individual often becomes disinclined for exercise, actual muscular weakness being added to lessened zest in life.

Such symptoms would be readily accounted for by a recent illness, *e.g.* influenza, but with no such obvious cause, the patient is apt to be labelled neurasthenic and treated by rest, a voyage, and so forth. Improvement often follows such measures, but, if an unsuspected focal sepsis is the essential cause, the symptoms probably recur in course of time, and may become more pronounced. The depression may deepen into profound apathy or melancholia; suicidal impulses are by no means rare, while the patient certainly may drift into habits of intemperance, and loss of mental balance may eventuate in definite hallucinations or delusional insanity.

The following is an example of the slighter type of case:—

A lady, aged 44, was losing her memory and becoming very depressed. Formerly a keen rider and delightful hostess she found a curious inability to join in society, a cause of unhappiness to herself and to her husband who had an important command in India. Seven years previously her right antrum had been opened and drained and all decayed teeth extracted, but she gradually and steadily became more neurasthenic.

Exploration of the sinuses showed that both antra were sterile, but both sphenoidal sinuses infected, yielding polynuclears and

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abundance of staphylococcus and streptococcus. Drainage of the infected sphenoidal sinuses soon restored her joy in life, her sociability, and mental alacrity.

Examples of delusional insanity I have described elsewhere in greater detail than is possible here.

A case of acute mania with delusions may be briefly quoted.

W. M., aged 29, a bank clerk, was normally most intelligent and of bright disposition.

In 1911, influenza followed by insomnia, caused great depression and inability to work or think. Three months later, on the advice of a distinguished alienist, he went a voyage, but (as he told me later) he took a pistol, meaning to kill himself if he got no relief. Six months later he was no better, and was becoming melancholic, declaring he was "devil-driven," "had committed unpardonable sins," "he was a dead man." He refused all food and had to be forcibly fed by two male attendants. He had chronic pansinusitis, and as he had become a lunatic, his parents took the responsibility of assenting to a radical operation on all the sinuses. It is noteworthy that cultures from the sinuses yielded only a pure staphylococcus aureus. The patient took some months to recover his mental balance, which, however, became completely restored. He returned to work, and has occupied the position of manager of the largest bank in his native town without interruption for over twelve years.

Crime and Sepsis.—I feel constrained to touch on this important aspect of the mental disturbances determined by nasal or aural infection. There are two directions in which the infective disease may operate. The first is by mental confusion and loss of memory.

In the second class, with delusions of suspicion, or of being persecuted, or poisoned, the unbalanced mind is liable to lead to disastrous crime. Cacosmia and foul taste of food from sinusitis, both common complaints in such cases, may, in the mind unhinged by focal sepsis, become delusions suggesting "gassing" or "food poisoning." Sir George Savage records examples of the growth of delusion in this way. Anxious as I am to avoid wandering from ascertained facts into mere hypothesis, we are warranted in believing that, between these extremes, mental depression and confusion may certainly suffice to account for criminal acts which are obviously stupid and utterly at variance with the known character of the perpetrator.

Once within the pale of the law, a prisoner's culpability is

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the jurist's responsibility. Though it may be difficult at present, and perhaps dangerous, to differentiate between those cases in which crime is determined by infections, and those due to innate moral obliquity, it is surely our duty to consider how far sepsis should be ranged with other toxic causes of mental and moral degeneration, such as alcohol, morphia, cocain, or syphilis, and thus perhaps help to prevent many social and legal transgressions.

Ford-Robertson's researches furnished evidence of the causal factor of bacterial infection in dementia præcox, and, in several of his cited cases, showed that the bacillus of Friedländer, the streptococcus and other pyogenic organisms abounded in the naso-pharynx.

In his Goulstonian Lectures on acute infective or toxic conditions of the nervous system, Farquhar Buzzard traced the toxic cell changes in acute, moderate, and advanced cases, and he showed that "it is toxins not organisms that seem to cause the pathological changes." He stated, further, that "there is no specificity in the microscopical evidence of toxic influence as regards cell changes." One may be permitted to wonder how many of the cases labelled tabes or general paralysis of the insane, in which neither Wassermann reaction nor history lends support to syphilitic infection, may be attributable to toxæmia from focal sepsis.

Cryptogenic or Latent Focal Sepsis and Toxæmia.

It seems natural, and yet it is a serious error, to gauge the virulence of a septic sinus infection by the local inflammatory reaction and outpouring of pus, and hence to assume that chronic non-purulent sinusitis must be less prone to cause toxæmic manifestations than those with obvious and profuse purulent discharge. The free outpouring of pus does not wholly prevent but certainly tends to diminish toxæmia, while the relative absence of pus in these infective cases seems to increase liability to systemic poisoning.

Many years ago I explored the sphenoidal and other sinuses in some cases referred by my ophthalmic colleague, a procedure in which I felt justified, notwithstanding the absence of pus, because complete loss of sight from retrobulbar neuritis was feared. The results from disinfection thus obtained far exceeded expectation, particularly as in so many of the truly suppurative sinus cases no retinal changes occur. Then followed corre-

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sponding experiences by others, *e.g.* H. M. Fish, referring to retrobulbar neuritis, emphasised the fact that he had had several cases in which, although there was no nasal discharge and the nasal examination was absolutely negative, save for a slight hyperæmia, he had relieved the ocular symptoms by simply draining the sinus. One of Fish's cases suggests that a detached retina may be comparable to a detached pleura in pleural effusion.

This was the position in 1904. In the meanwhile, diagnostic technique in nasal sinusitis has made great strides, and it has become possible to determine with far greater accuracy whether, on the one hand, any of the paranasal sinuses are infected, or whether such a source of infection can be definitely excluded.

This remarkable influence of "latent" rather than of the manifest purulent infections in causing retrobulbar neuritis obtains in most of the systemic toxæmias from nasal sepsis, such as chronic rheumatoid arthritis, neuritis, and rheumatism. Regarding the curious proclivity for locally mild infective processes to result in systemic toxæmia, I suggested, in 1907, "that in the numerous polymorpho-nuclear cells in the one case, as contrasted with their paucity in the others, we have an explanation of the remarkable differentiation to which I have drawn attention."

Many others, conspicuously Henry Cotton, have stressed the cryptogenic character of the focal sepsis in causing many cases of functional psychosis due to septic toxæmia.

Diagnosis of Latent Sinus Infection.—When ordinary diagnostic methods of examination fail us, even with the assistance afforded by skiagraphy, as often is the case in chronic nasal sinus infection with toxæmic symptoms, it is necessary to resort to more exact diagnostic procedures. I have found endo-rhinoscopy and diagnostic exploration by the suction syringe of the utmost value in such circumstances. It is hardly necessary to describe my method of diagnostic exploration of the sinuses, with bacteriological examination by stained films and culture which I have employed in many thousand sinus investigations, during the last twenty-five years and more. Brief reference to two cases will suffice to illustrate the practical application of endo-rhinoscopy combined with exploration for exact and differential diagnosis of latent nasal sepsis.

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The first, an example of an average case, was a child aged 11, apparently suffering from adenoids with recurrent colds, aprosexia, etc. No adenoids or tonsillar hypertrophy were present. Endo-rhinoscopy suggested left antral infection (Figs. 1, 2 and 3)—

Exploration of Sinuses and Bacteriological Findings.

Sinus extracts.	Culture.
Antra—clear.	L. Antrum, no polynuclears, no cocci.
Sphenoidal Sinuses, R. 3 in., do. clear.	R.S.S., no polynuclears, a few staphylococci.
Do. do. Left, 1 c.c. of thick curdy pus withdrawn.	L.S.S. polynuclears, phagocytosis of G.P. cocci. Strept. and Staph. alb.
Do. do. Velvety œdematous mucosa of walls felt.	

The second example illustrates the special procedures adopted to overcome the difficulties presented by developmental irregularities in the anatomical arrangement of the sphenoidal sinuses and posterior ethmoidal cells (Figs. 4, 5, 6 and 7).

An adult male was becoming blind in one eye, and sight in the other was beginning to fail. Ordinary inspection of the nasal passages revealed nothing abnormal, while endorhinoscopy showed little more than a stream of pus from the right antrum and an area of vascular turgescence in the right spheno-ethmoidal area (Fig. 4). By suction-syringe exploration of the antra, posterior ethmoidal cells (Fig. 5) and sphenoidal sinuses, macroscopic evidence of pus was *not* forthcoming. The test to discover whether both sphenoidal sinuses had been entered proved the existence of a free communication through the two cannulæ *in situ*; hence only one large sinus had been entered through the right and left nasal passages (Fig. 6). Whether it was an exceptionally large right or large left sinus could only be ascertained by finding the small ill-developed sinus that had been missed. On passing another cannula rather laterally, the true right sphenoidal sinus was found and the contents sucked out (Fig. 7). A test proved that this did not communicate with the large left sinus. A similar method was then used to prove that the right posterior ethmoidal cell and sphenoidal sinus had been truly found.

The test is made by passing two cannulæ and injecting distilled water or normal saline along one of them. If both have entered the same cavity, the water is seen escaping through the proximal end of the other cannula; again, on sucking back through the first cannula the escaping water in

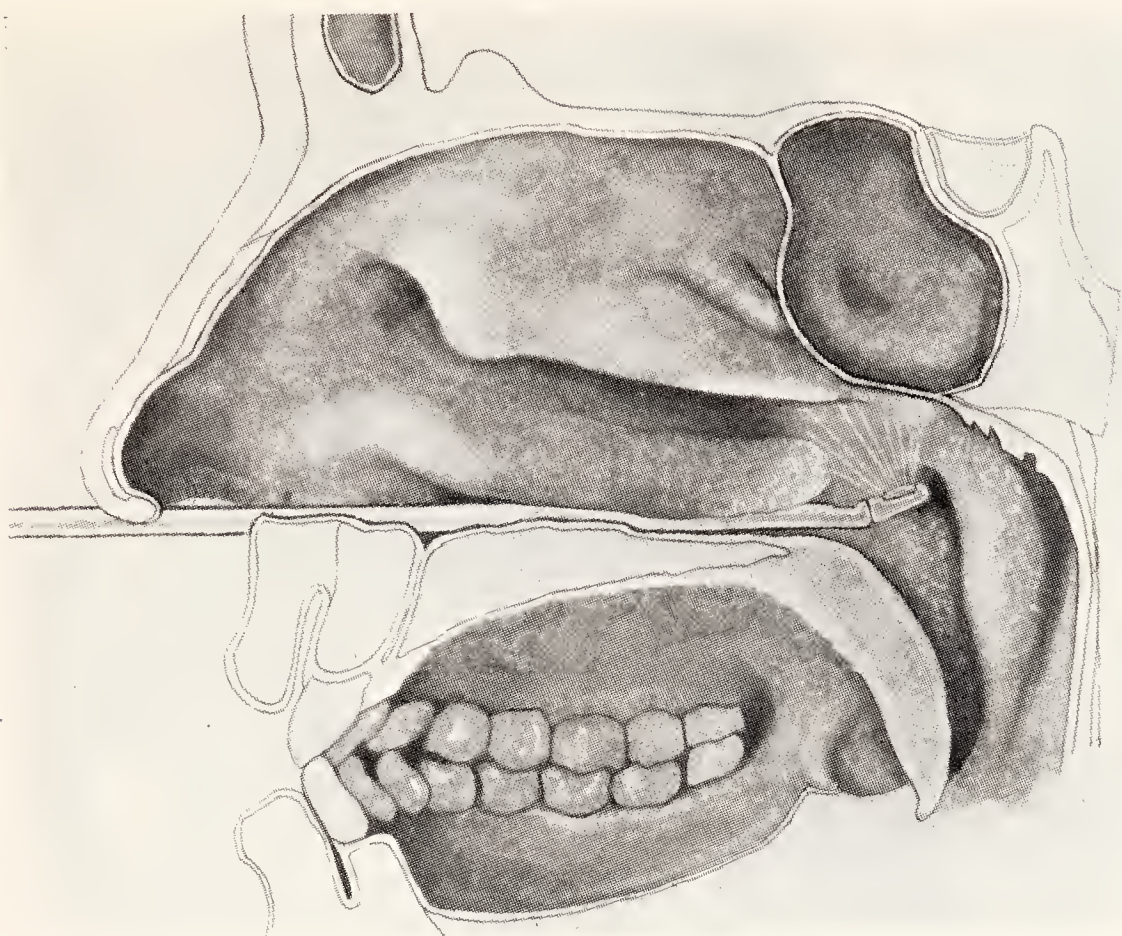


FIG. 1.—Endorhinoscopy.

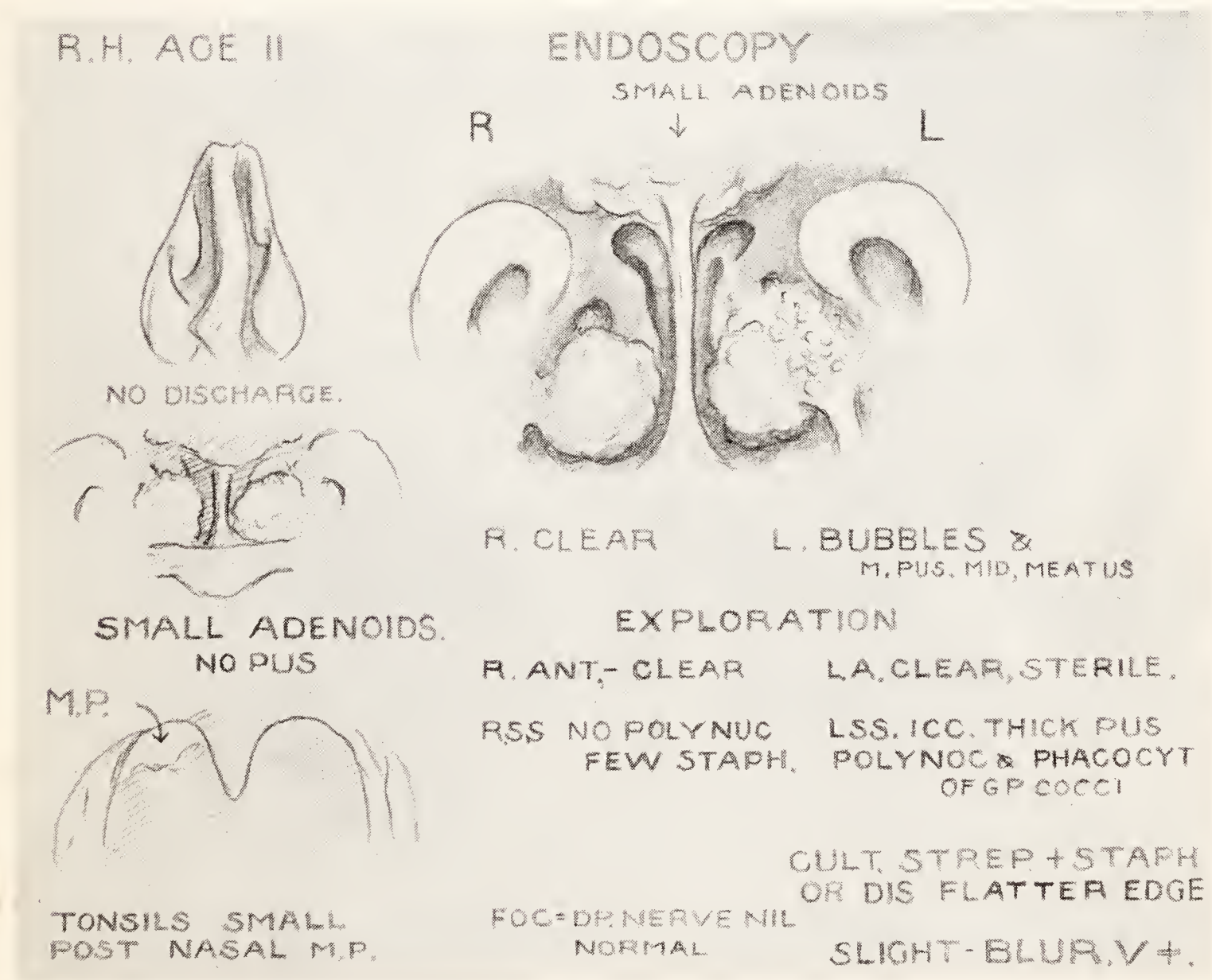


FIG. 2.—Case R. H. The endorhinoscopic appearances show the right nasal passages clear, while on the left is seen a stream of discharge coming from above the middle turbinate on to the posterior end of the inferior turbinate.

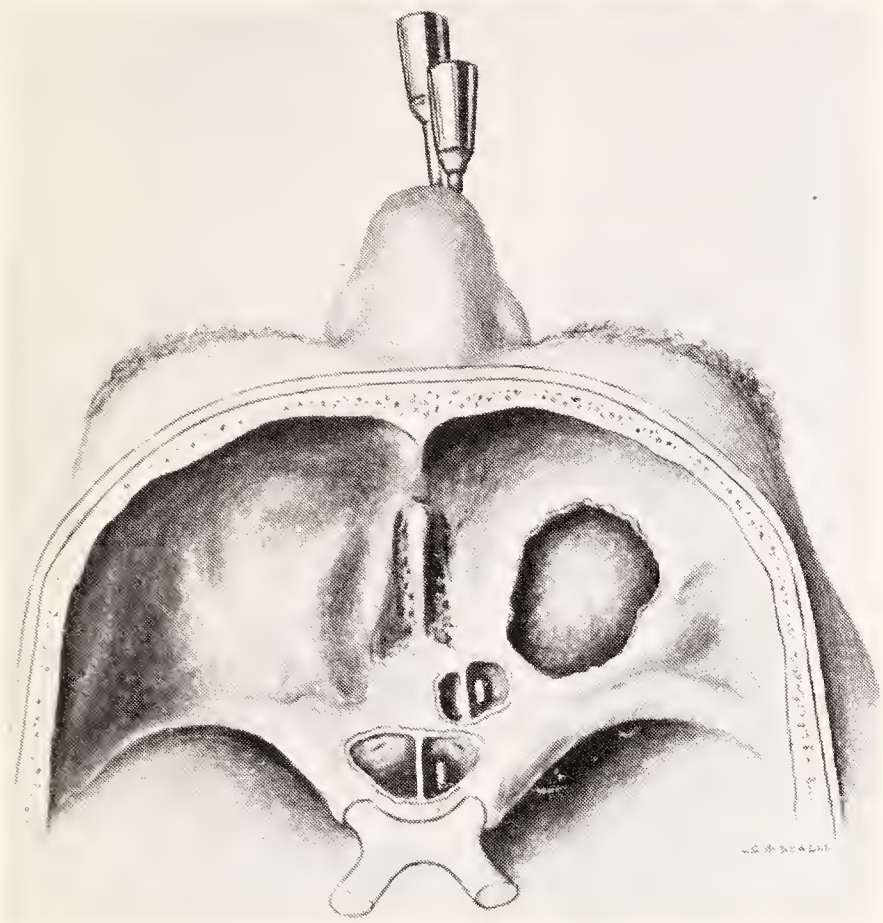


FIG. 3.—The base of the anterior cranial fossa. The roof of the right orbit, posterior ethmoidal cell, and sphenoidal sinuses laid open. The sphenoidal sinuses are separated normally by a mesial septum. Two cannulae have been passed through the right nasal passage; one straight backwards has entered the right sphenoidal sinus, and the other, directed somewhat outwards, has entered the right posterior ethmoidal cell. (Case R. H.).

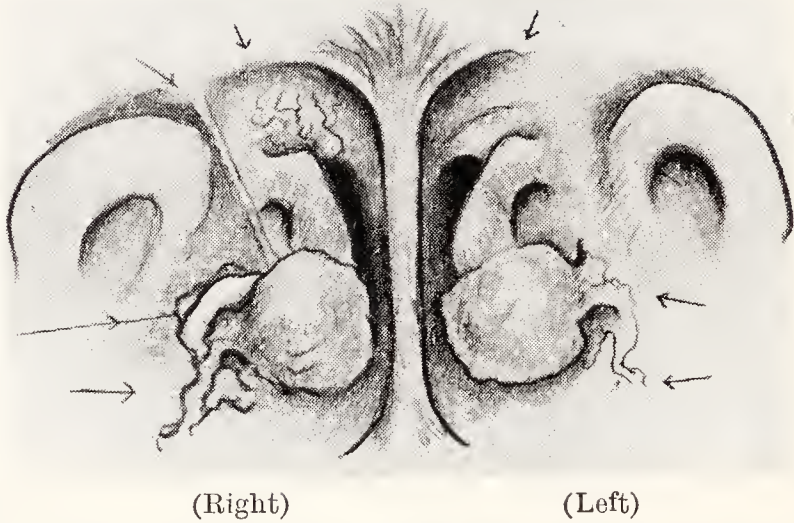


FIG. 4.—Endorhinoscopic image showing the left side normal. On the right side a streak of pus is seen coming from the middle meatus; the vessels are congested here and also in the roof of the choana, on the right side only.

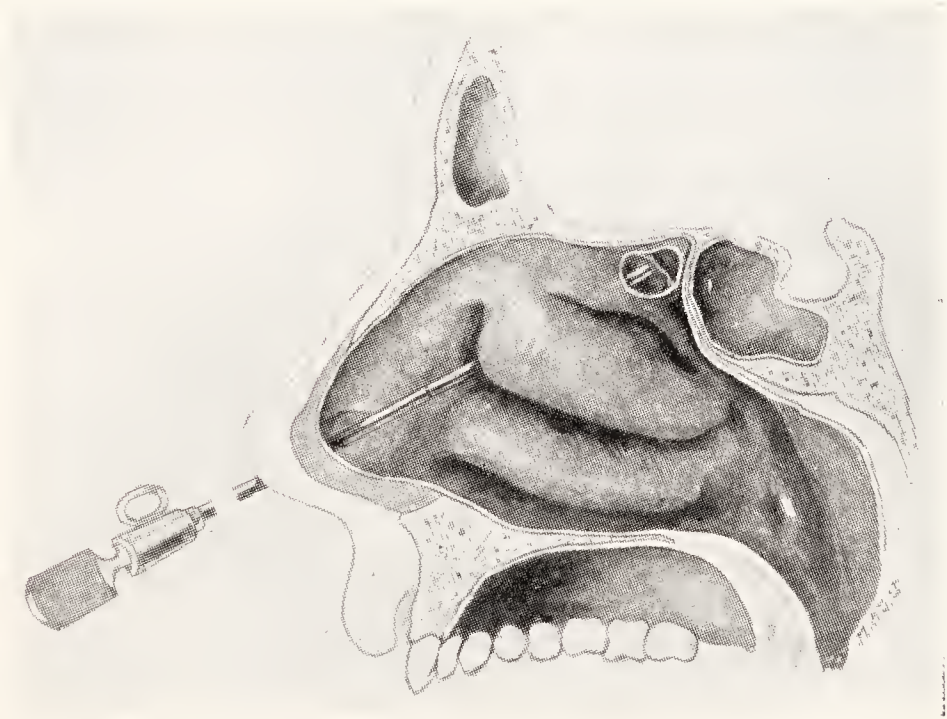


FIG. 5.—Exploration with the cannula of the right posterior ethmoidal cell.

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the free cannula is seen to recede. If the cannulæ are in different cavities, this of course does not occur.

It was fortunate that the small right sphenoidal sinus in this case was not missed, because it was highly infected by pure streptococcus which had caused the blindness complained of. The other sinuses on the right side were infected with staphylococcus, while on the left side all were sterile, except for a slight growth of staphylococcus in the posterior ethmoid

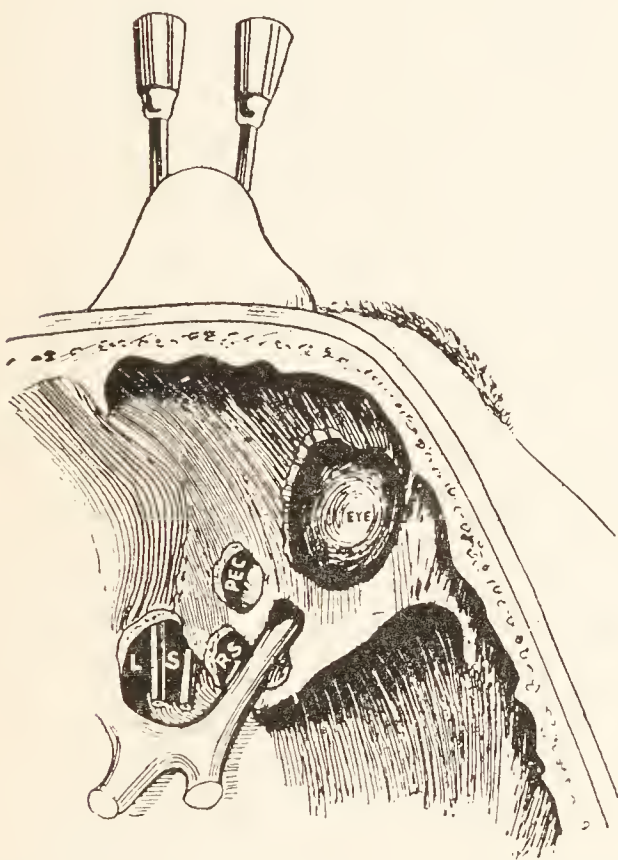


FIG. 6.—The anatomically irregular sphenoidal sinuses exposed. The abnormally large left sinus has been entered by both cannulæ passed the one through the right and the other through the left nasal passage, thus missing the very ill-developed right sinus.

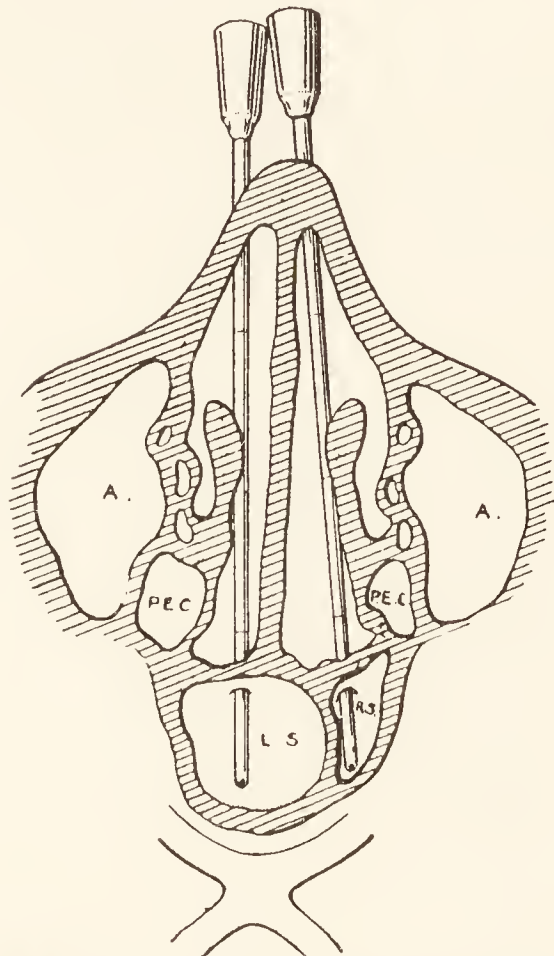


FIG. 7.—To explore the ill-developed right sinus, another inserted cannula has been directed outwards. With a local anæsthetic these explorations were quite painless.

cell. Thus, as very usually happens, the sinus exploration definitely proved infection corresponding to the clinical conditions, while the other sinuses were negative.

Adequate discussion of all aspects of the subject has been impossible, and while touching too lightly on most points, restrictions of space and time altogether exclude some, *e.g.*, endocrine disturbances, from sepsis.

It cannot be denied that I have recounted much that is already known and recorded, for one has but to search our literature to realise that the relation of functional psychoses to nasal affections has been the theme of many observers.

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Culpepper, in 1668, in his "Last Legacy," writing on the causes of forgetfulness, assigns abundance of phlegm as the first internal cause, "the excrements are many at the mouth and nose, proceeding from the brain," and he describes the patients as heavy and inclined to long and troublesome sleep and lethargy.

We are reminded (by Wells) that John Jacob Wepfer, in 1728, stated that nasal obstruction caused violent headaches, disturbances of vision and loss of memory; and Hack, in 1882, suggested that nasal affections might be profitably studied from a psychiatric standpoint. Wells himself described in his illuminating article, in 1898, in "Nervous and Mental Manifestations in connection with Nasal Disease," the clinical picture of the neurasthenic from nasal infections.

In the work carried on at the New Jersey State Hospital at Trenton, founded many years ago by private generosity, we have most impressive evidence of the causal connection between the functional psychoses and sepsis.

Sir George Newman states that nearly one-sixth of the industrial invalidity of this country is due to diseases classed as rheumatic, and that each year these are costing Approved Societies nearly £2,000,000 in sick benefit and the nation over 3,000,000 weeks of work from the insured population alone.

Appalling as is the social and economic loss from tuberculosis (estimated at £98,700,000 annually in Great Britain), that from focal sepsis is immensely greater. Even after excluding from consideration all the acute septic infections of the nose, throat, and ear, all the disasters from the direct extension of such acute focal infections and sub-infections, whether intracranial, orbital, cardiac, renal, or causing rheumatic fever, and restricting our purview simply to the toll of the mild and often missed chronic focal infections, recalling their causal influence on definite disease of the lung, gastro-intestinal tract, joints, and peripheral nerves, we have extended the lessons gathered from territories that can be directly observed to the often intangible and elusive toll levied on cerebration.

The slighter mental disturbances amounting to alteration in character, disposition, and power of concentration are fruitful causes of unhappiness in the home, of broken hearts, of business losses, and loss of time and energy to the working man; while the more pronounced manifestations are seen in the lunatic asylums, perchance in the prisoner or the suicide, amounting to

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a stupendous toll of truly national import, and the pity of it is that the causal infection is so largely amenable to successful elimination. Maybe these remarks apply equally to mental affections from aural sepsis.

On those of us, who guard the portals where such a large preponderance of these infections gain entry, lies perhaps a greater responsibility than falls to any other department of medicine and surgery. Every industrial school, Borstal institution, prison, and asylum call for a more systematic medical investigation, not confined to the internal physician, but with the active co-operation of the aural, laryngeal and dental surgeon. We learnt how to recover radium from rubbish. Can we afford to maintain in these human dustheaps, numbers of men, women, and children who, if adequately treated, might become useful and happy workers?

Of the thousands of suicides that occur in our midst the story is not unusual that the wretched individual had "suffered lately from pains in the head and was depressed," but the verdict of "suicide while of unsound mind" closes the chapter without any systematic post-mortem investigation to determine the material and remediable cause of these tragedies which, in a very large proportion, is almost certainly some form of toxæmia. In the young delinquent, at any rate, there is reason to believe that the evil genius is often much more "Sepsis" than "Satan."

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